

Appendix A

Ecological and Hydrological Investigation

Attachment A-1
Predesign Investigation

Continental Steel Superfund Site--Contract 2 Ecological and Hydrological Investigations

TO: USEPA
FROM: CH2M HILL
DATE: November 12, 2001

Introduction

This memorandum documents activities performed in association with Contract 2 Ecological and Hydrological Investigations of the Continental Steel Superfund Site (CSSS) remedial design (RD) project, Work Assignment (WA) #122-RDRD-05BW. Contract 2 includes the Kokomo and Wildcat Creeks Sediment Removal part of the RD. Related field activities were conducted in Wildcat, Kokomo, and Little Deer creeks. (Little Deer Creek is the reference stream for Kokomo Creek evaluation.) Wildcat and Kokomo creeks are adjacent to the CSSS. Little Deer Creek study reach is located in Carroll County upstream of State Highway 29. Work associated with these investigations commenced on June 11, 2001 and were completed on June 22, 2001.

This memorandum contains information on:

- Personnel involved with associated field activities and corresponding time in which they performed the field work
- Specific field activities performed
- Deviations from the *Quality Assurance Project Plan, Continental Steel Superfund Site* (May 2001; QAPP)
- Unusual circumstances encountered during field work
- Figures identifying field work areas

Personnel

Field personnel associated with Contract 2-Ecological Investigations are listed in Table 1.

TABLE 1
Field Personnel

Staff	Staff Role	Duration
Mike Mischuk/MKE	Ecological Lead	June 11 through June 22, 2001
Winthrop Allen/MKE	Ecological Assistant	June 11 through June 22, 2001

Field Activities

The object of the field work was to characterize "baseline" stream biological conditions. Field activities centered on physicochemical assessments, habitat quality, and biological health through the use of two indicator groups: benthic macroinvertebrates and fish. The fieldwork and deviations from the QAPP are discussed below.

Sample Reach Locations

Eight sample reaches were investigated (Figures 1, 2, and 3). Sample locations and descriptions are summarized in Table 2.

TABLE 2
Sample Reaches

Creek	Reach No.	Reach Description
Wildcat	1	Downstream of Dixon Road
Wildcat	2	From Dixon Road upstream to Railroad Bridge
Wildcat	3	From Railroad Bridge to confluence with Kokomo Creek
Kokomo	4	From confluence with Wildcat Creek upstream to Highland Park
Wildcat	5	From confluence with Kokomo Creek upstream to Markland Avenue Bridge
Wildcat	6	From Markland Avenue Bridge upstream to Flow control structure just upstream of Phillips Street Bridge
Wildcat	7	Fish sampling - 0.7 miles upstream of Delco Park Macroinvertebrate sampling- Just below dam, Kokomo Waterworks Reservoir No. 2
Little Deer Creek	8	Carroll County, East of State Highway 29, and north of Sharon, IN

Deviations There were no deviations from the sample reach locations specified in the QAPP. See Figures 1, 2, and 3 for additional detail.

Physical Characterization/General Water Quality Assessment

To assist in interpreting biological information, the physical characteristics and water quality at the time of biological sampling were evaluated. Information collected included physical characteristics (substrate compositions, stream width, ect.) and general water quality parameters (dissolved oxygen, pH, ect.) The results of the physical characterization/water quality assessment are presented in Table 3.

Deviations. No deviations were made from the QAPP.

Habitat Assessment

Habitat quality and quantity affect the structure and composition of benthic macroinvertebrate and fish communities. A qualitative habitat assessment was conducted to assess the support of the assigned aquatic life use for each of the stream reaches. The Qualitative Habitat Evaluation Index (QHEI) protocol for habitat assessments, as developed by Ohio Environmental Protection Agency and adopted by the Indiana Division of Fish and Wildlife, was used. Habitat scores are presented in Table 4.

TABLE 3

Water Quality and Physical Characteristics at Wildcat, Kokomo, and Little Deer Creek Bioassessment Reaches, June 2001.

Parameter	Units	Reach							
		1	2	3	5	6	7	Kokomo Creek	Little Deer Creek
Date/Time		6/12/01-1027	6/13/01-1050	6/14/01-1114	6/14/01-1310	6/19/01-1240	6/16/01-1028	6/15/01-0758	6/18/01-0844
Dissolved Oxygen	mg/L	9.28	8.93	8.28	9.28	6.77	8.82	8.79	8.35
Temperature	°C	21.03	22.3	24.45	25.58	25.18	24.21	23.4	19.9
pH	units	7.8	7.7	7.76	8.03	7.84	7.36	7.48	7.12
Specific Conductance	µmho	674	629	654	656	535	486	630	566
Hardness	mg/L as CaCO ₃	295	290	281	273	254	250	292	322
Turbidity	NTU	4.3	3.2	5.3	3.6	NS	NS	NS	NS
Predominant land use		Agricultural/ Industrial	Industrial	Commercial/ Industrial	Commercial/ Industrial	Residential/ Industrial	Agricultural/ Residential	Commercial/ Industrial	Agricultural
High water mark	m	2	3	2	2	1	1	2	1
Velocity	fps	0.27	0.26	0.27	0.27	1.37	2.04	0.14	1.5
Percentage of Inorganic Substrate									
Boulder		10	10	10	10	5	20	5	5
Cobble		40	10	20	20	5	20	10	15
Gravel		30	50	50	50	10	30	30	30
Sand		20	20	20	10	60	30	45	30
Silt			10		10	20		10	20
Clay									
Percentage of Organic Substrate									
Detritus		100	100	85	90	90	80	70	100
Muck-mud				10	10	10		20	
Marl				5			20	10	

mg/L = milligrams per liter

µmho/cm = micromhos per centimeter

m = meter

fps = feet per second

°C = degrees Celsius

NTU = nephelometric turbidity units

NS = not sampled, instrument problem

TABLE 4

Summary of Habitat Quality Index Scoring for Wildcat, Kokomo, and Little Deer Creek Bioassessment Reaches, June 2001

Reach								
							Kokomo Creek	Little Deer Creek
	Wildcat Creek							
Habitat Parameter ^a	1	2	3	5	6	7	4	8
Substrate	14	15	14	12	8	17	6	15
Instream Cover	19	18	15	13	15	13	9	15
Channel Morphology	16	12	10	7	7	13	5	15
Riparian Zone and Bank Erosion	4	2	4	2	4	7	2	5
Pool/Glide and Riffle/Run Quality	9	17	17	8	15	12	12	12
Gradient	10	10	10	10	10	8	8	10
Total Score	72	74	70	52	59	70	42	72

^a Based on Ohio QHEI format

Deviations. No deviations from the QAPP.

Aquatic Community Investigation

Macroinvertebrate Sampling. Macroinvertebrates were sampled in each stream reach from a representative riffle area (see Figures 1, 2, 3). Two 1-m² kick net samples were obtained from each riffle, one in a faster flowing area and one in a slower flowing area. The two samples were composited into a single sample for processing and community assessment. Samples were sent to a laboratory for processing and analysis. Crayfish of the family Cambaridae were collected for tissue analysis within each stream reach. Samples were sent to a laboratory for analysis.

Fish Sampling. Fish were sampled within each stream reach using either a boat mounted electrofishing unit (Wildcat Creek) or a backpack unit (Kokomo and Little Deer creeks). To help reduce the bias of a sampling technique, a second sampling technique—seining—was conducted within each reach. At least three seine hauls were made in shallow pools and runs downstream of each representative riffle area. Table 5 lists the species collected within each sample reach. Selected fish (target species) also were retained for tissue analysis. Table 6 lists the species collected for tissue analysis. All fish tissue samples were sent to a laboratory for processing.

Deviations. The fish tissue sample used for SVOC analysis from Little Deer Creek was 75 grams, less than the 100 grams stipulated in the QAPP.

Other Observations

The following conditions were observed and noted in the field logbook or on field data sheets while conducting work in the Wildcat, Kokomo Creeks, and Little Deer Creeks:

- Erosion of the landfill cap on the property south on the site and just upstream of the railroad bridge was noted.
- Trash and debris were observed in the creeks and along the banks at several locations.
- The odor of treated wastewater effluent was also noted in the stream below the Kokomo WWTP.
- Several outfall pipes were observed along both creeks.

TABLE 5

Fish Species Collected from Reaches in Wildcat, Kokomo, and Little Deer Creek Bioassessment Reaches, June 2001

		Reaches								
		Wildcat Creek							Kokomo Creek	Little Deer Creek
Common Name	Scientific Name	1	2	3	5	6	7		4	8
Gizzard shad	<i>Dorosoma cepedianum</i>		1			1	1			
Common carp	<i>Cyprinus carpio</i>	8	13	8	12	7	7		4	1
Goldfish	<i>Carassius auratus</i>				1					
Golden shiner	<i>Notemigonus crysoleucus</i>					3				
Creek Chub	<i>Semotilus atromaculatus</i>	2								17
Redfin shiner	<i>Cyprinella lutrens</i>			6						4
Spotfin shiner	<i>Cyprinella spiloptera</i>	64		12					1	
Bluntnose minnow	<i>Pimephales notatus</i>			3					2	119
Sand shiner	<i>Notropis ludibundus</i>	5		9						22
Quillback	<i>Carpiodes cyprinus</i>		2				4			
White sucker	<i>Catostomus commersoni</i>	5	17	6	15	4				3
Spotted sucker	<i>Minytrema melanops</i>	1	10	14	47	54	18		1	
Northern hog sucker	<i>Hypentilium nigricans</i>	4	11	14	1	2			3	2
Black redhorse	<i>Moxostoma duquesnei</i>			1	1					
Golden redhorse	<i>Moxostoma erythrurum</i>	9	14	17	14	16	31			4
Channel catfish	<i>Ictalurus punctatus</i>				2					
Yellow bullhead	<i>Ameiurus natalis</i>								3	
White bass	<i>Morone chrysops</i>			1	3					
Black crappie	<i>Pomoxis nigromaculatus</i>			1	7	1	2			
Rock bass	<i>Ambloplites rupestris</i>	3	11	2	4	1	1		5	25
Largemouth bass	<i>Micropterus salmoides</i>	1		2	1	3			1	
Spotted bass	<i>Micropterus punctulatus</i>				3	5				
Smallmouth bass	<i>Micropterus dolomieu</i>	1	12	2	3		1			1
Green sunfish	<i>Lepomis cyanellus</i>	2							3	
Bluegill	<i>Lepomis macrochirus</i>	4	1	6	7	6	5		5	
Pumpkinseed	<i>Lepomis gibbosus</i>			1	5	10			4	26
Longear sunfish	<i>Lepomis megalotis</i>	30	5	2	6	8			3	3
Walleye	<i>Stizostedion vitreum</i>	7	4	4	7	4	5			
Saugeye	<i>Stizostedion</i>		1							
Logperch	<i>Percina caprodes</i>			1						5
Greenside darter	<i>Etheostoma blennioides</i>			2	1				1	4
Rainbow darter	<i>Etheostoma caeruleum</i>									12
Total Number of Organisms		146	102	114	140	125	75		36	248
Total Number of Species		15	13	21	19	15	10		13	15

TABLE 6

Fish Species Collected for Tissue from Reaches in Wildcat, Kokomo, and Little Deer Creeks, June 2001

Reach	Common Name	Scientific Name	Length (mm)	Weight (g)
1	White sucker	<i>Catostomus commersoni</i>	385	500
	White sucker	<i>Catostomus commersoni</i>	347	500
2	White sucker	<i>Catostomus commersoni</i>	355	500
	White sucker	<i>Catostomus commersoni</i>	328	390
3	White sucker	<i>Catostomus commersoni</i>	385	580
	White sucker	<i>Catostomus commersoni</i>	368	530
	White sucker	<i>Catostomus commersoni</i>	380	660
	White sucker	<i>Catostomus commersoni</i>	337	470
4	Northern hog sucker	<i>Hypentilium nigricans</i>	255	200
	Northern hog sucker	<i>Hypentilium nigricans</i>	198	100
	Northern hog sucker	<i>Hypentilium nigricans</i>	170	60
5	White sucker	<i>Catostomus commersoni</i>	400	760
	White sucker	<i>Catostomus commersoni</i>	430	820
6	White sucker	<i>Catostomus commersoni</i>	347	510
	White sucker	<i>Catostomus commersoni</i>	350	500
7	Spotted sucker	<i>Minytrema melanops</i>	360	550
	Spotted sucker	<i>Minytrema melanops</i>	353	510
8	Northern hog sucker	<i>Hypentilium nigricans</i>	208	110
	Northern hog sucker	<i>Hypentilium nigricans</i>	175	75

